SH3000

HIGH IMPEDANCE, WIDEBAND DC AMPLIFIER

FAIRCHILD HYBRID CIRCUITS

GENERAL DESCRIPTION - The SH 3000 Hybrid consists of a pair of high-gain, matched transistors connected as emitter-followers at the inputs of a μA 702A operational amplifier.

FEATURES

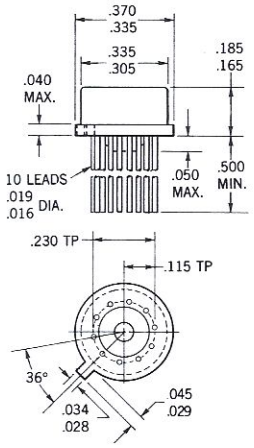
- 5 MΩ TYPICAL INPUT IMPEDANCE
- 0.3 μA TYPICAL INPUT BIAS CURRENT
- DC TO 30 MHz USEFUL BANDWIDTH
- LATCH-UP PROTECTED
- −55°C TO +125°C TEMPERATURE RANGE

ABSOLUTE MAXIMUM RATINGS (Note 1)

Total Supply Voltage Between V^+ and V^- Terminals	21 Volts
Peak Load Current	50 mA
Input Voltage	+0.5 V to -6.0 V
Differential Input Voltage	± 5 Volts
Internal Power Dissipation (Note 1)	300 mW
Operating Temperature Range	-55°C to +125°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 60 seconds)	300°C

PHYSICAL DIMENSIONS

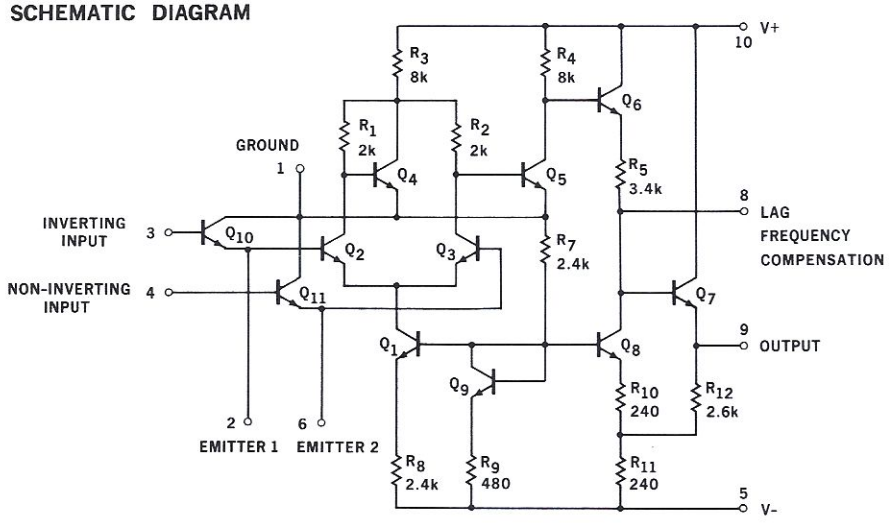
TO-100
(10 pin package)



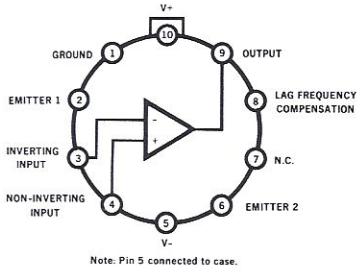
NOTES: All dimensions in inches
Leads are gold-plated kovar
Lead No. 1 internally connected to case
Package weight is 1.32 grams

PART NO. HAG30001XX:
−55°C TO +125°C

SCHEMATIC DIAGRAM



CONNECTION DIAGRAM



Note: Pin 5 connected to case.

CONNECTION DIAGRAM
(TOP VIEW)

NOTE 1: Rating applies for case temperatures to +125°C; derate linearity at 5.6 mW/°C for ambient temperatures above +125°C.

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FAIRCHILD
SEMICONDUCTOR
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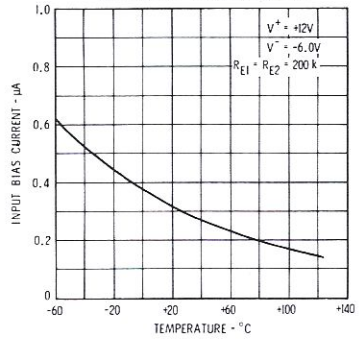
MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING U. S. PATENTS: 291877, 3015048, 3025589, 3064167, 3108359, 3117260; OTHER PATENTS PENDING.

ELECTRICAL CHARACTERISTICS (T_A = +25°C, V^+ = 12 V, V^- = -6.0 V, R_{E1} = R_{E2} = 200 k unless otherwise noted)

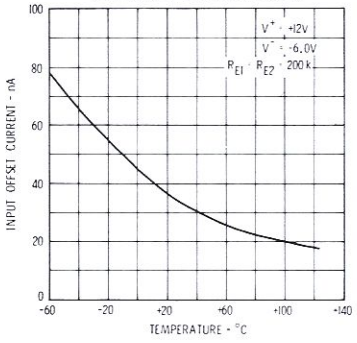
Parameter	Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage	$R_S \leq 20$ k		2.0	6.0	mV
Input Offset Current			35	100	nA
Input Bias Current			300	750	nA
Input Resistance		1.0	5.0		m Ω
Input Voltage Range		-3.5		0	V
Common Mode Rejection Ratio	$R_S \leq 20$ k, f $\leq$ 1 kHz	70	80		dB
Voltage Gain		1400	2600		
Output Voltage Swing	$R_L \geq 100$ k	±5.0	±5.3		V
Supply Voltage Rejection Ratio			75		μV/V
Power Consumption			70	120	mW
The following Specifications apply for -55°C $\leq$ +125°C:					
Input Offset Voltage	$R_S \leq 20$ k			7.5	mV
Voltage Gain		1000			
Input Offset Current	T_A = +125°C			100	nA
Input Offset Current	T_A = -55°C			200	nA
Input Bias Current	T_A = -55°C			1.0	μA
Average Temperature Coefficient of Input Offset Voltage			7.5		μV/°C

TYPICAL PERFORMANCE CURVES

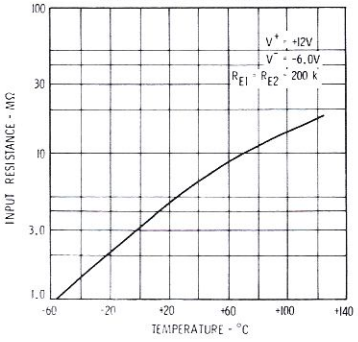
INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



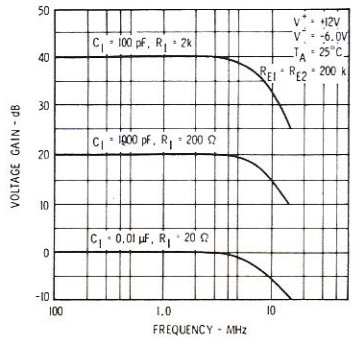
INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



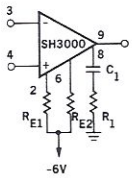
INPUT RESISTANCE AS A FUNCTION OF AMBIENT TEMPERATURE



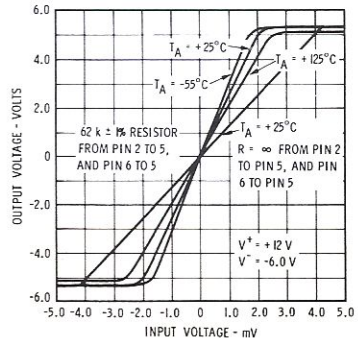
FREQUENCY RESPONSE FOR VARIOUS CLOSED-LOOP GAINS



FREQUENCY COMPENSATION CIRCUIT



VOLTAGE TRANSFER CHARACTERISTIC


OUTPUT VOLTAGE - VOLTS
6.0
4.0
2.0
0
-2.0
-4.0
-6.0
TA = +25°C
TA = +125°C
TA = -55°C
62 k ± 1% RESISTOR FROM PIN 2 TO 5, AND PIN 6 TO 5
TA = +25°C
R = ∞ FROM PIN 2 TO PIN 5, AND PIN 6 TO PIN 5
V+ = +12 V
V- = -6.0 V
-5.0 -4.0 -3.0 -2.0 -1.0 0 1.0 2.0 3.0 4.0 5.0
INPUT VOLTAGE - mV

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